

### **REMARKS**

The applicants originally submitted claims 1-21 in this application. In a previous response to a restriction requirement, the applicants elected Group I (claims 1-17). The applicants hereby confirm the cancellation of claims 18-21. The applicants have amended claims 1, 7 and 14, but have not cancelled any claims. Accordingly, claims 1-17 remain pending in this application.

### **Claim Rejections – 35 U.S.C. § 112**

Claims 1-17 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention. More specifically, the Examiner states that the use of the language “oxygen alone” and “oxygen-rich” in the independent claims causes uncertainty. The applicants have amended independent claims 1, 7 and 14 to clarify that the first environment includes oxygen and at least one of chlorine-containing gases, fluorine-containing gases and carbon monoxide. In view of these amendments, the applicants respectfully submit that the language at issue does not cause any uncertainty to one of ordinary skill in the art.

Also, the Examiner states that it is unclear whether the language “with at least one” in line 5 of each independent claim modifies “oxygen” or an “environment”. As just discussed, the applicants have amended independent claims 1, 7 and 14 to clarify that the first environment includes oxygen and at least one of chlorine-containing gases, fluorine-containing gases and carbon monoxide alleged unclear language. In view of these amendments, the applicants respectfully submit that line 5 of each independent is clear with respect to the Examiner’s clarity concern.

Also, the Examiner states that it is unclear if the list of additional gases of the independent claims is supposed to be a Markush limitation or not. In response to the Examiner’s concern, the applicants respectfully note that the applicants have amended independent claims 1, 7 and 14, as discussed hereinabove, to clarify that the first environment includes oxygen and at least one

of chlorine-containing gases, fluorine-containing gases and carbon monoxide. The applicants note that the list of gases in addition to oxygen is not meant to be a Markush group. Had the applicants intended to recite a Markush group, the applicants would have used the language “at least one gas chosen from the group consisting of” or “at least one gas chosen from the group consisting essentially of”. The applicants respectfully submit that, in view of the amendments to the independent claims as discussed above, the language at issue is sufficiently clear to denote the applicants’ claimed subject matter.

Also, the Examiner states that the definitions on page 5 of the specification are indefinite. More specifically, the Examiner states that the definitions that refer to known gases are unclear as to who it is known and at what time. The Examiner further notes that a potential infringer would know not know if the definitions are limited to gases that are known at the time of the invention, the date of issue, or the date of potential infringement.

In response to the Examiner’s concerns, the applicants respectfully submit that the language at issue on page 5 of the specification is not indefinite and refers to any gases known at the time of the invention by one skilled in the art of optical fiber manufacturing to be used for doping and/or dehydration that contain either fluorine or chlorine. Any future gases that are not yet known for such use would not fall into the defined categories. Any gases that are known for such use on the date of issue or the date of potential infringement would fall within the defined categories if they also were known for such use at the time of the invention. As such, the applicants fail to understand how the language in question is indefinite.

Also, the Examiner states that, in claim 4, it is unclear whether the two members are open to additional members. In response to the Examiner’s concern, the applicants note that the embodiment of the invention set forth in the claimed subject matter of claim 4 is not meant to be a Markush-type claim. Had the applicants intended to recite a Markush group, the applicants would have used the language “at least one exposing step chosen from the group consisting of” or “at least one exposing step chosen from the group consisting essentially

of". However, in the interest of furthering the prosecution, the applicants are willing to rewrite claim 4 as two separate dependent claims that both depend from claim 1 if such action is deemed by the Examiner as resolving any clarity concerns of the Examiner.

Finally, the Examiner states that, in claim 7, there is no antecedent basis for "the aging loss increase." The applicants have amended claim 7 by changing "the aging loss increase" to "any aging loss increase," thereby eliminating any issue of lack of antecedent basis in the claim.

In view of the claim amendments and foregoing remarks, the applicants respectfully submit that claims 1-17 are clear, and respectfully request that the Examiner withdraw the rejection under 35 U.S.C. §112.

#### **Claim Rejection – 35 U.S.C. § 103**

The Examiner rejected claims 1-17 under 35 U.S.C. §103(a) as being unpatentable over Backer (US Patent No. 5,180,411) in view of Tuminaro (US Patent No. 6,496,627). The applicants respectfully traverse the rejection in view of the foregoing claim amendments and the remarks set forth below.

The applicants' have amended independent claims 1, 7 and 14 to clarify that the applicants' invention adjusts the oxygen stoichiometry at various steps in the fiber manufacturing process to create environments that are neither oxygen-rich nor oxygen-deficient. Such adjustment reduces aging loss in the fibers produced. Support for the claim amendments is found in the applicants' specification, e.g., at page 9, lines 3-33. The applicants respectfully submit that none of the cited references, including Backer, teaches adjusting oxygen stoichiometry to create an environment that is neither oxygen-rich or oxygen-deficient.

It is not enough for the Examiner to say that "it is inherent that the Backer environment is neither excessive nor deficient in its oxygen content" to render the applicants' claimed invention obvious when conventional fiber manufacturing processes prior to the applicants' invention (including Backer) have neither taught nor suggested adjusting the specific oxygen stoichiometry used in the

deposition, dehydration and/or consolidation steps to reduce aging loss. As the Examiner states, the Backer patent is enabled and functions properly. However, absent any discussion of improving aging loss, the Backer reference produces an optical fiber that suffers from aging loss, similar to other conventional fibers. Conventional fiber manufacturing processes are performed in environments that actually are too rich or too deficient in oxygen content, hence the need in the art for reducing aging or hydrogen aging loss in fibers manufactured by conventional methods. See the discussion in the applicants' specification, e.g., from page 7, line 26 to page 8, line 7. Nothing in Backer teaches or suggests adjusting the oxygen stoichiometry to create an environment that reduces silicon defects in the fiber produced, thus reducing aging loss.

The applicants' invention recognizes the cause of silicon defects and provides a method to reduce such defects. In many cases, the novelty of an invention involves recognizing the cause of a problem more so than solving the problem once the problem is recognized. To say that a conventional fiber process such as the one taught in Backer inherently solves the problem that the applicants' recognize and provide a solution for is far beyond what Backer teaches or even suggests. Backer focuses on improving fatigue resistance in fibers, especially in the outer cladding, by providing a  $\text{TiO}_2$ - $\text{SiO}_2$  outer cladding. Backer neither mentions aging loss nor suggests any solutions for reducing such loss, much less adjusting oxygen stoichiometry to do so. It is unreasonable to conclude that Backer teaches or suggests the problems recognized and solved by the applicants. Certainly, one skilled in the art would not recognize the cause of hydrogen aging loss, thus they clearly would not have the available knowledge to provide a suitable solution. A solution cannot be provided to a problem that the prior art (including Backer) does not recognize. The applicants not only recognize the problem of hydrogen aging loss in fiber and its cause, but provide a unique solution to reduce such loss, a solution that is neither taught nor suggested by any cited art, including Backer.

Therefore, the applicants' respectfully submit that Backer does not disclose all of the claimed invention except for deuterium exposure. Moreover,

Tuminaro, which is cited for its teaching of deuterium exposure, does not cure the defects of Backer with respect to the applicants' claimed invention. That is, Tuminaro, like Backer, does not teach or suggest adjusting the oxygen stoichiometry to create an improved environment for reducing aging loss. Accordingly, the applicants' respectfully submit that the applicants' invention as recited in the amended claims hereinabove is not obvious in view of the combination of Backer and Tuminaro, and respectfully request that the Examiner withdraw the rejection under 35 U.S.C. §103(a) over Backer in view of Tuminaro.

**Claim Rejection – 35 U.S.C. § 103**

The Examiner rejected claims 1 and 5 under 35 U.S.C. §103(a) as being unpatentable over Oyobe (US Patent No. 5,262,365) in view of Tuminaro and Baumgart (US Patent No. 4,820,322). The applicants respectfully traverse the rejection in view of the foregoing claim amendments and remarks.

As discussed hereinabove, the applicants' have amended claim 1 to clarify that the applicants' invention adjusts the oxygen stoichiometry at various steps in the fiber manufacturing process to create environments that are neither oxygen-rich nor oxygen-deficient. Nothing in Oyobe or the combination of Oyobe, Tuminaro and Baumgart teaches or suggest the applicants' invention as recited in claim 1, as amended. Oyobe, which the Examiner states discloses the applicants' invention except for the deuterium treatment and the overcladding, discloses the use of vapor axial deposition (VAD) as a suitable substitute for MCVD in making rare earth doped silica glass used to make active optical devices such as fiber amplifiers. Oyobe is concerned with erbium doped fibers; nothing in Oyobe teaches or suggests reducing aging loss in fiber, much less adjusting the oxygen stoichiometry to create an improved environment for reducing aging loss.

Tuminaro, which is cited for its use of deuterium exposure, fails to cure Oyobe's lack of teaching or suggestion of the applicants' invention as recited in amended claim 1. Similarly, Baumgart, which is cited for its teaching of

overcladding a preform made by MCVD, does not cure the deficiencies of Oyobe as compared to the applicants' invention as recited in amended claim 1.

Claim 5 depends from claim 1 and is patentably distinct over the cited art for at least all of the reasons discussed above in connection with claim 1.

Furthermore, claim 5 includes other features not shown in or suggested by the art of record.

In view of these remarks, the applicants respectfully request that the Examiner withdraw the rejection under 35 U.S.C. §103(a) over Oyobe in view of Tuminaro and Baumgart.

**Claim Rejection – 35 U.S.C. § 103**

The Examiner rejected claims 7 and 12 under 35 U.S.C. §103(a) as being unpatentable over either of Kyoto (US Patent No. 4,902,325) or Backer when combined with Chandross (US Patent No. 5,240,488) and Tuminaro. The applicants respectfully traverse the rejection in view of the foregoing claim amendments and remarks.

The Examiner states that Kyoto is directed to the formation of a fiber preform, which is treated in the gas atmosphere as claimed in the applicants' claims 7 and 12. The applicants' respectfully disagree. Kyoto discloses a VAD manufacturing method that reduces OH defects (not aging loss defects such as oxygen-rich silicon defects or oxygen-deficient silicon defects) by dehydrating in oxygen and chlorine or a chlorine-containing compound. Moreover, Kyoto does not teach or suggest adjusting oxygen stoichiometry. Also, as discussed hereinabove, the applicants' invention adjusts the oxygen stoichiometry at various steps in the fiber manufacturing process (not just the dehydration step) to create environments that are neither oxygen-rich nor oxygen-deficient.

The Examiner states that Backer also is directed to the formation of a fiber preform, which is treated in the gas atmosphere as claimed in the applicants' claims 7 and 12. As discussed previously herein, Backer fails to teach or suggest the applicants' invention as recited in claims 7 and 12. The applicants

respectfully note the previous discussion regarding Backer's failure to disclose or suggest the applicants' invention.

Chandross, which is cited for its disclosure of a sol gel overlaid tube, does not cure the deficiencies of Kyoto with respect to the applicants' invention as recited in claims 7 and 12. Tuminaro, which is cited for its use of deuterium exposure, also fails to cure the deficiencies of Kyoto as compared to the applicants' claims 7 and 12.

Claim 12 depends from claim 7 and incorporates all of the features of claim 7. Furthermore, claim 12 include other features not shown in or suggested by the art of record.

In view of these remarks, the applicants respectfully request that the Examiner withdraw the rejection under 35 U.S.C. §103(a) over Kyoto and Backer in view of Chandross and Tuminaro.

The applicants submit that all claims now are in patentable form, and respectfully urge that all the claims be allowed and the application be passed to issue. If the Examiner disagrees, the Examiner is invited to call the attorney for the applicants at the telephone number provided below.

Respectfully submitted,

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